February 4, 1892.

Mr. JOHN EVANS, D.C.L., LL.D., Treasurer, in the Chair.

The Right Hon. Farrer Herschell, Baron Herschell, was admitted into the Society.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "On the New Star in Auriga. Preliminary Note." By J. Norman Lockyer, F.R.S. Received February 4, 1892.

From a note in 'The Times' of Wednesday, February 3rd, I learnt that a new star had been discovered in the constellation Auriga, and that photographs had been obtained at Greenwich on Monday night.

Observations were therefore impossible here before last night. This is much to be regretted, and suggests that some local organisation is needed to further quick transmission of news to observing stations relating to phenomena which may change in a few days or even hours.

Last night was fortunately fine, and two photographs were taken of the spectrum:—

	h.	m.				
The 1st exposed.....	1	30,	from	7.30	to	9
The 2nd ,, ...	3	0	,,	9.30	,,	12.30

The first registered thirteen lines; the second appears to contain some additional ones, but they are very faint and have not yet been measured.

A complete discussion of these photographs will form the substance of a subsequent communication, but already the following approximations to the wave-lengths have been obtained, the photographs being treated absolutely independently, means, however, being taken for the four least refrangible lines, as there has not yet been time to construct a proper curve for this region.

I have recently taken up the question of stellar spectra, and find that a 6-inch object glass, with a prism in front of it, is all that is required for the brighter stars. This instrument was employed upon the nova, which is of about the 5th magnitude, so the exposures were necessarily long.

Lines Measured in the First Photograph.

Wave-length.	Hydrogen lines.	Probable origin.
3933 (K)	..	Ca
3968	H	
4101	*h*	
4128		
4172		
4226	..	Ca
4268		
4312	..	Hydrocarbon
4340	G	
4516		
4552		
4587		
4618		

Lines Measured in the Second Photograph.

Wave-length.	Hydrogen lines.	Probable origin.
3933 (K)	..	Ca
3968	H	
4101	*h*	
4130		
4172		
4227	..	Ca
4268		
4310	..	Hydrocarbon
4340	G	
4516		
4552		
4587		
4618		

For the eye observations, the new 3-foot mirror, which has recently been presented to the Astrophysical Laboratory by Mr. Common, was employed, but unfortunately the clock is not yet mounted, so that the observations were difficult.

C was the brightest line observed. In the green there were several lines, the brightest of which was in all probability F, the position being estimated by comparison with the flame of a wax taper. Another line was coincident, with the dispersion employed, with the radiation at λ 500 from burning magnesium wire. A fainter line between the two last named was probably near λ 495, thus completing the trio of lines which is characteristic of the spectra of nebulæ. There was also a fairly bright line or band coincident with the edge of the carbon fluting near λ 517 given by the flame of the

taper. A feeble line in the yellow was coincident, under the conditions employed, with the sodium line at D.

The hydrogen line at G was distinctly seen, as well as a band or group of lines between G and F.

Nearly all the lines appear to be approximately, if not actually, coincident with the lines seen in the various types of Cygnus stars, the chief difference being the apparent existence of carbon, hydrocarbon, and calcium in the nova.

The colour was estimated by Mr. Fowler as reddish-yellow, and by Mr. Baxandall as rather purplish. My own impression was that the star was reddish, with a purple tinge. This was in the 10-inch achromatic. In the 3-foot reflector it was certainly less red than many stars of Group II. No nebulosity was observed either in the 3-foot or the 10-inch refractor, nor does any appear in a photograph of the region taken by a $3\frac{1}{2}$-inch Dallmeyer lens with three hours' exposure. It should be stated that the camera was carried by the photographic telescope, the clock of which had had its normal rate purposely changed to give breadth to the spectrum.

The photographs were taken and reduced by Messrs. Fowler and Baxandall. The eye observations and comparisons were made by Mr. Fowler alone.

II. "Note on the Energy Absorbed by Friction in the Bores of Rifled Guns." By Captain NOBLE, C.B., F.R.S., &c. (late Royal Artillery). Received December 31, 1891.

The object of the experiments which I proceed to describe was to ascertain approximately, and under varied conditions, the loss of energy due to the friction of the driving ring of the projectile in the bores of rifled guns.

The rotation of modern breech-loading projectiles is generally given by means of a copper ring or band on the projectile, on a plan originally proposed by Mr. Vavasseur, the diameter of this ring being not only somewhat larger than that of the bore, but even larger than the diameter of the circle representing the bottom of the grooves, and the projections which give the rotation are formed by the pressure of the powder gases forcing the driving ring into the grooves of the gun. At the commencement of motion the driving ring is consequently exactly moulded to the section of the bore at the seat of the shot, and under the conditions due to the pressure to which the gun is at the moment subjected.

It will readily be conceived that a band or ring, moulded as described, may give rise to considerable friction in its passage through the bore, and the amount of this friction may be modified to a considerable extent by various circumstances.